LISTING OF CLAIMS

1. (Twice Amended) A gas plasma emission source comprising:

a resonant cavity;

a tube disposed through the resonant cavity, the tube enclosing a sample under test; and

a solid state power source coupled through a coaxial cable to the resonant cavity to excite resonant oscillations in the resonant cavity, the resonant oscillations exciting a plasma in the sample under test, the plasma constituting a fluctuating load on the solid state power source.

2. (Cancelled) A gas plasma emission source comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity; and

a coaxial cable coupled between the solid state power source and the resonant cavity.

3. (Twice Amended) A gas plasma emission source comprising:

a resonant cavity; and

a solid state power source coupled to the resonant cavity, wherein the resonant cavity includes a tube disposed through the resonant cavity, the tube being configured so that a sample under test enters one end of the tube, passes through the resonant cavity and exits an open end of the tube.

4. (Previously Amended) A gas plasma emission source comprising a resonant cavity and a solid state power source coupled to the resonant cavity, wherein:

the solid state power source couples into the resonant cavity a power level to sustain a plasma in a gas disposed within the resonant cavity, the power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and

the power level is substantially stable with respect to the fluctuating load.

5. (Previously Amended) The emission source of claim 4, wherein the power level is less than 100 watts.

6. (Cancelled) A gas plasma emission source comprising;

a resonant cavity; and

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity, wherein the solid state power source includes an oscillator coupled to a solid state power amplifier.

7. (Cancelled) An atomic emission detector comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity.

8. (Original presented in independent form) [The] An atomic emission detector ~~of claim 7~~ comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity, wherein:

the resonant cavity has a tube disposed along an axis;

the gas enters the tube from one end of the tube, another end of the tube being an open end; and

the spectrographic detector is disposed to sense atomic emissions emitted from the open end.

9. (Cancelled) The detector of claim 7, further including a cable coupled between the solid state power source and the resonant cavity.

10. (Original presented in independent form) [The] An atomic emission detector ~~of claim 7~~ comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity, wherein:

the resonant cavity includes a tube disposed through the resonant cavity; and

the tube comprises one of a fused silica tube and a sapphire tube.

11. (Original presented in independent form) [The] An atomic emission detector ~~of claim 7~~ comprising:

a resonant cavity;

a solid state power source coupled to the resonant cavity to excite resonant oscillations in the resonant cavity; and

a spectrographic detector disposed to sense atomic emissions from a gas within the resonant cavity, wherein:

the solid state power source is coupled to the resonant cavity to provide a power level to sustain a plasma in the gas within the tube, the power level being less than 300 watts;

the plasma constitutes a fluctuating load on the solid state power source; and

the power level is substantially stable with respect to the fluctuating load.

12. (Amended) The detector of claim 11, wherein the power level is less than 100 watts.

13. (Cancelled) The detector of claim 7, wherein the solid state power source includes an oscillator coupled to a solid state power amplifier.

14. (Amended) A method of sustaining a plasma comprising steps of:

passing a gas through a resonant cavity; ~~and~~

exciting the resonant cavity with signal power from a solid state power source to sustain the plasma in the gas; and

directly observing the plasma with a spectrographic detector having an unobstructed view of atomic emissions from the plasma through an open end of a tube passing through the resonant cavity.

15. (Cancelled) The method of claim 14, wherein the step of exciting includes exciting the resonant cavity with signal power that is less than 300 watts.

16. (Cancelled) The method of claim 14, further comprising a step of sensing a wavelength of radiation emitted from the plasma.

17. (Cancelled) The method of claim 14, further comprising a step of sensing an intensity of radiation emitted from the plasma.

18. (Cancelled) A method of using a solid state power source, comprising steps of:

passing a gas through a resonant cavity; and

coupling a signal at a power level from an output of the solid state power source to sustain a plasma in the gas, the power level being less than 300 watts.

19. (Cancelled) The method of claim 18, further comprising a step of sensing a wavelength of radiation emitted from the plasma.

20. (Cancelled) The method of claim 18, further comprising a step of sensing an intensity of radiation emitted from the plasma.

21. (New) A gas plasma emission source according to claim 1, wherein the tube comprises one of a fused silica tube and a sapphire tube.

22. (New) A gas plasma emission source according to claim 1, wherein:

the tube is configured in the resonant cavity so that the sample under test enters one end of the tube, passes through the resonant cavity and exits an open end of the

tube, a line between the plasma and the open end of the tube being unobstructed by walls of the tube; and

the gas plasma emission source further comprises a spectrographic detector disposed to sense atomic emissions emitted from the open end of the tube.

23. (New) A gas plasma emission source according to claim 22, wherein the tube comprises one of a fused silica tube and a sapphire tube.

24. (New) A gas plasma emission source according to claim 1, wherein the solid state power source couples a power level into the resonant cavity sufficient to sustain the plasma, the power level being less than 100 watts, the power level being substantially stable with respect to the fluctuating load.

25. (New) A gas plasma emission source according to claim 3, wherein the tube comprises one of a fused silica tube and a sapphire tube.

26. (New) A gas plasma emission source according to claim 3, further comprising a spectrographic detector disposed to sense atomic emissions emitted from the open end of the tube, wherein:

a signal from the solid state power source excites a plasma in the sample under test; and

a line between the plasma and the spectrographic detector through the open end of the tube is unobstructed by walls of the tube.

27. (New) A gas plasma emission source according to claim 26, wherein the tube comprises one of a fused silica tube and a sapphire tube.

28. (New) A gas plasma emission source according to claim 3, wherein the solid state power source couples a power level into the resonant cavity sufficient to sustain the plasma, the power level being less than 100 watts, the power level being substantially stable with respect to the fluctuating load.